

I Claim:

1. Self-reducing, cold-bonded pellets, comprising, by weight, about 60-79% iron oxide-containing material, a main portion of said material being between about 200 mesh or smaller, about 10-26% carbonaceous reducing agent with a particle size of about 48 mesh or smaller, and about 10-20% finely divided Portland cement clinker as a binder wherein about 90% or more of the total volume of the cement clinker particles measure less than 0.08 mm and the portion of dicalcium silicate contained in the cement clinker is less than about 20% by weight, with the total weight of the iron oxide-containing material, carbonaceous reducing agent and cement clinker being 100 %.
2. The pellets of claim 1, wherein said iron oxide-containing material is iron ore concentrate having an iron content of at least about 60% by weight.
3. The pellets of claim 2, wherein said pellets further comprise iron ore fines, steelmaking dust, blast furnace dust, rolling scales or a mixture thereof combined with said iron ore concentrate.
4. The pellets of claim 1, wherein said carbonaceous reducing agent is coke breeze, non-coking coal, wood char, graphite or a mixture thereof.
5. The pellets of claim 1, wherein said cement clinker contains about 50% by weight or more of tricalcium silicate.
6. The pellets of claim 4, wherein said cement clinker contains tricalcium silicate and tricalcium aluminate in a ratio from about 5:1 to 10:1.
7. The pellets of claim 4, wherein said cement clinker has a free-calcium oxide content of less than about 3% by weight.

8. The pellets of claim 1, wherein said pellets are cured in air for about 14-28 days at a temperature of about 20°C or higher without being placed in direct sunlight.

9. The pellets of claim 1, wherein said pellets have a size ranging from about 8-16 mm.

10. The pellets of claim 1, wherein said pellets are cured with a curing gas having a carbon dioxide content of about 10% by volume or more at a temperature ranging from about 100-300 °C.

11. The pellets of claim 10, wherein said pellets are cured for about 24-96 hours.

12. The pellets of claim 1, wherein said pellets further comprise an additive for adjusting the basicity of said pellets.

13. A process for producing the pellets of claim 1, comprising mixing said iron oxide-containing material, said carbonaceous reducing agent, and said finely divided Portland cement clinker, placing said mixture and water into a pelletizing device, grading said pellets to produce pellets with a predetermined size ranging from about 8-16 mm and containing about 8-12% by weight water, and placing said graded pellets into a reacting device to cure said graded pellets with a curing gas containing carbon dioxide at a temperature ranging from about 100-300 °C.

14. The process of claim 13, wherein said reacting device is a vertical tank having an inlet at its top and an outlet at its bottom, the inside of said tank being divided into upper and lower portions, said curing gas being introduced into said lower portion and discharged from said inlet of said tank after contacting the pellets inside said lower and upper portions, said graded pellets sequentially and continuously proceeding down through said upper and lower portions of said reacting device after entering said reacting device from said inlet, said graded pellets being cured in said reacting device by hydration, carbonation and desiccation before said pellets are discharged from said outlet of said reacting device.

15. The process of claim 14, wherein said reacting device is a single vertical tank.

16. The process of claim 14, wherein said curing time of said pellets for said hydration, carbonation and desiccation is about 24-96 hours.

17. The process of claim 13, wherein said carbon dioxide content in said curing gas is about 10 percent by volume or more.

18. The process of claim 13, wherein said curing gas is waste gas obtained from a hot blast stove, a power plant, or a heating furnace of a rolling mill or industrial stove.

19. The process of claim 15, wherein said pelletizing device is a ball disc or rotating drum and said pellets are graded by a roller screen.

20. The process of claim 13, wherein said mixture further comprises an additive for adjusting the basicity of said pellets.

21. Self-reducing, cold-bonded pellets, comprising, by weight, about 60-79% iron ore concentrate having an iron content of at least about 60% by weight, a main portion of said iron ore concentrate being between about 200 mesh and 325 mesh, about 10-26% carbonaceous reducing agent with a particle size of about 48 mesh or smaller, and about 10-20% finely divided Portland cement clinker as a binder wherein about 90% or more of the total volume of the cement clinker particles measure less than 0.08 mm, the portion of dicalcium silicate contained in the cement clinker is less than about 20% by weight, the cement clinker contains about 50% by weight or more of tricalcium silicate, the cement clinker contains tricalcium silicate and tricalcium aluminate in a ratio from about 5:1 to 10:1 and the cement clinker has a free-calcium oxide content of less than about 3% by weight, with the total weight of the iron ore concentrate, carbonaceous reducing agent and cement clinker being 100 %, the pellets having a size ranging from about 8-16 mm.

22. The pellets of claim 21, wherein said pellets further comprise iron ore fines, steelmaking dust, blast furnace dust, rolling scales or a mixture thereof combined with said iron

ore concentrate.

23. The pellets of claim 21, wherein said carbonaceous reducing agent is coke breeze, non-coking coal, wood char, graphite or a mixture thereof.
24. The pellets of claim 21, wherein said pellets are cured in air for about 14-28 days at a temperature of about 20°C or higher without being placed in direct sunlight.
25. The pellets of claim 21, wherein said pellets are cured with a curing gas having a carbon dioxide content of about 10% by volume or more at a temperature ranging from about 100-300 °C.
26. The pellets of claim 25, wherein said pellets are cured for about 24-96 hours.
27. The pellets of claim 21, wherein said pellets further comprise an additive for adjusting the basicity of said pellets.
28. The pellets of claim 21, wherein said pellets are cured and have a cold compression strength of about 78-200 kgf/pellet.
29. The pellets of claim 21, wherein said pellets are cured and have a hot strength greater than about 1,000 °C.
30. Self-reducing, cold-bonded pellets, comprising, by weight, about 60-79% iron ore concentrate having an iron content of at least about 60% by weight, a main portion of said iron ore concentrate being between about 200 mesh and 325 mesh, about 10-26% carbonaceous reducing agent with a particle size of about 48 mesh or smaller, and about 10-20% finely divided Portland cement clinker as a binder wherein about 90% or more of the total volume of the cement clinker particles measure less than 0.08 mm, the portion of dicalcium silicate contained in the cement clinker is less than about 20% by weight, the cement clinker contains about 50% by weight or more of tricalcium silicate, the cement clinker contains tricalcium silicate and

tricalcium aluminate in a ratio from about 5:1 to 10:1 and the cement clinker has a free-calcium oxide content of less than about 3% by weight, with the total weight of the iron ore concentrate, carbonaceous reducing agent and cement clinker being 100 %, the pellets having a size ranging from about 8-16 mm, said pellets being cured with a curing gas having a carbon dioxide content of about 10% by volume or more at a temperature ranging from about 100-300 °C and having a cold compression strength of about 78-200 kgf/pellet.

31. The pellets of claim 30, wherein said pellets have a hot strength greater than about 1,000 °C.

32. A process for producing the pellets of claim 31, comprising mixing said iron ore concentrate, said carbonaceous reducing agent, and said finely divided Portland cement clinker, placing said mixture and water into a balling disc or rotating drum to form ball pellets, grading said ball pellets by a roller screen to produce pellets with a predetermined size ranging from about 8-16 mm and containing about 8-12% by weight water, and placing said graded pellets into a reacting device to cure said graded pellets with said curing gas containing carbon dioxide at said temperature ranging from about 100-300 °C., said reacting device being a vertical tank having an inlet at its top and an outlet at its bottom, the inside of said tank being divided into upper and lower portions, said curing gas being introduced into said lower portion and discharged from said inlet of said tank after contacting the pellets inside said lower and upper portions, said graded pellets sequentially and continuously proceeding down through said upper and lower portions of said reacting device after entering said reacting device from said inlet, said graded pellets being cured in said reacting device by hydration, carbonation and desiccation before said pellets are discharged from said outlet of said reacting device.